

CLAIMS:

1. A graft fixation device for fixing a graft member within a bone tunnel, the device comprising:

5 a bioabsorbable radially expandable sheath having a substantially closed distal end with at least two sidewalls extending proximally therefrom and defining a central lumen, each sidewall having a substantially concave outer surface adapted to seat a graft member, and each side wall being at least partially separated by a longitudinally oriented slot extending from a proximal end along a substantial length of each sidewall and terminating at a position proximal to the distal end; and

10 a bioabsorbable sheath expander adapted to be disposed in the central lumen of the radially expandable sheath and configured to flex the sidewalls to radially expand the sheath so as to fix the graft member within a bone tunnel.

15 2. The graft fixation device of claim 1, wherein a distal portion of the radially expandable sheath extending between a distal end of the longitudinally oriented slots and a distal end of the sheath tapers to form a bullet-shaped distal tip.

20 3. The graft fixation device of claim 1, wherein the sheath expander and a distal-most end of the radially expandable sheath each include a lumen extending therethrough for receiving a guide wire.

4. The graft fixation device of claim 2, wherein the sidewalls each include surface features formed within the concave outer surface thereof.

25 5. The graft fixation device of claim 1, wherein at least two adjacent sidewalls are joined at a proximal end thereof by a stop member adapted to prevent over-insertion of the radially expandable sheath into a bone tunnel.

30 6. The graft fixation device of claim 1, wherein the sheath expander is a tapered screw.

7. The graft fixation device of claim 6, wherein the sheath expander has a largest diameter that is greater than a largest inner diameter of the radially expandable sheath in an unexpanded state.

5 8. The graft fixation device of claim 1, wherein the device is formed from a material having one or more polymers or copolymers formed of monomers selected from the group consisting of lactic acid, glycolic acid, and caprolactone.

10 9. The graft fixation device of claim 8, wherein the material further comprises tricalcium phosphate.

10. A graft fixation device for fixing a graft member within a bone tunnel, the device comprising a bioabsorbable radially expandable sheath having a substantially closed distal end with at least two sidewalls extending proximally therefrom and defining a central lumen, each  
15 sidewall having a substantially concave outer surface adapted to seat a graft member, and each side wall being at least partially separated by a longitudinally oriented slot extending from a proximal end along a substantial length of each sidewall and terminating at a position proximal to the distal end.

20 11. A graft fixation kit for fixing a graft member within a bone tunnel, the kit comprising:  
a bioabsorbable expandable sheath having proximal and distal ends with at least two sidewalls extending therebetween and defining a central lumen, each sidewall being at least partially separated by a longitudinally oriented slot extending from the proximal end and terminating at a position just proximal to the distal end, and each sidewall having an outer  
25 surface adapted to seat a graft member; and  
a plurality of sheath expanders of varying sizes, each being disposable in the central lumen of the expandable sheath and configured to flex the sidewalls to radially expand the sheath so as to fix at least one graft member within a bone tunnel.

30 12. The kit of claim 11, wherein the expandable sheath defines a distal tip that tapers from a distal end of each longitudinally oriented slot to the distal end of the expandable sheath.

13. The kit of claim 12, wherein the distal tip of the expandable sheath is rounded.

14. The kit of claim 12, wherein the sidewalls of the expandable sheath each include a  
5 concave outer surface having surface features formed thereon.

15. The kit of claim 11, wherein two adjacent sidewalls of the expandable sheath are joined  
at a proximal end thereof by a stop member adapted to prevent over-insertion of the expandable  
sheath into a bone tunnel.

16. The kit of claim 11, wherein each sheath expander is a tapered screw.

17. The kit of claim 16, wherein the sheath expander has a largest diameter that is greater  
than a largest inner diameter of the radially expandable sheath in an unexpanded state.

18. A method for fixing a ligament graft in a bone tunnel comprising the steps of:  
forming a bone tunnel through bone;  
providing a ligament graft fixation system having an expandable sheath having proximal  
and distal ends with at least two sidewalls extending therebetween and defining a central lumen,  
each sidewall being at least partially separated by a longitudinally oriented slot extending from  
20 the proximal end and terminating at a position just proximal to the distal end of the expandable  
sheath;

suturing one end of a graft member to one or more ligaments extending through the bone  
tunnel;

25 inserting the expandable sheath into the bone tunnel while tensioning an opposed end of  
the graft member outside of the tunnel, such that the graft member is positioned between the  
expandable sheath and the bone tunnel;

inserting an expansion plug into the expandable sheath to expand the at least two  
sidewalls of the expandable sheath and thereby fix the graft member within the bone tunnel.

19. The method of claim 18, wherein two adjacent sidewalls are connected at a proximal end by a stop member, the stop member being adapted to abuts an opening of the bone tunnel to prevent over-insertion of the expandable sheath into the bone tunnel.